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Present Working Conditions in Slaughterhouses and Meat Selling Centres and Food Safety of Workers in Two Districts of Bangladesh

Mohammad Khurshed Alam[1]*, Yoshino Keiko[1] and Mohammad Mujaffar Hossain[2]

[1]Department of Agricultural Economics, Tokyo University of Agriculture, Tokyo 156-8502, Japan
[2]Department of Animal Science, Bangladesh Agricultural University, Mymensingh 2202, Bangladesh

ABSTRACT

The present study is aimed at (a) assessing the current overall conditions in slaughterhouses and meat selling centres and (b) evaluating food safety knowledge of workers of slaughterhouses and meat selling centres in two districts of Bangladesh. A questionnaire relating to facilities and hygienic conditions in the slaughterhouses and meat selling centres was administered to the foreperson at each site. A total of 116 workers from 20 selected slaughterhouses were interviewed through another structural questionnaire to evaluate their food safety conditions and hygiene practices. Among the twenty slaughterhouses and meat selling centres surveyed, 55% had roofs, 40% had toilets and 35% had handwashing facilities. Ten (10%) of slaughterhouses slaughtered sick animals. About 20% of the workers had health certificates, 15% of workers wore protective coats and only 10% of workers wore rubber boots. Only 70% of workers were knowledgeable about zoonotic diseases. Knowledge about food safety was poor among workers. The present working conditions in the study areas are not sufficient in the context of food safety. Improvement of facilities and hygiene practices is needed for worker safety and to reduce the possibility of meat contamination. Training should be given to workers of slaughterhouses and meat selling centres to improve food safety knowledge and increase awareness of risks.

Keywords: Food safety and hygiene practice, slaughterhouses

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E-mail addresses:
mka.sagor@gmail.com (Mohammad Khurshed Alam)
yosh@mbc.ocn.ne.jp (Yoshino Keiko)
mmh_bau2009@yahoo.com (Mohammad Mujaffar Hossain)
* Corresponding author

INTRODUCTION

Livestock is an important component of the food supply of rural and urban areas and contributes to family nutrition, supplying animal protein. Meat is an important source of animal protein and a valuable product in resource-poor communities in many

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developing countries like Bangladesh. A slaughterhouse is a facility where animals are slaughtered for consumption as human food. The noticeable reform of slaughterhouses was visible in the nineteenth century. This reform was a part of the rapid transition of industrial society from an agricultural society based on urbanization, technological development, and growing concern about public hygiene (Brantz, 2005). An anthropologist Noelle Vialles pointed out, "animal slaughtering tends to be a somewhat unpopular subject: no one wants to know about it" (Vialles, 1994). Philosopher Nancy Williams argued, there was an unwillingness among the public to think about how their meat was produced, and that this had important ethical implications(Williams, 2008). The slaughterhouse is a location from which one can view economic and geographic changes in the production of food, cultural attitudes towards killing, social changes in small communities, and the changing sensibilities and relations between humans and non-human animals (Fitzgerald, 2010).

In developing countries, facilities of large scale slaughterhouse or meat processing plant situated in the city area differ from that of rural areas with small scale slaughterhouses (Clottey, 1985). This difference between meat processing plants with modern facilities and small slaughterhouses in the meat industry is due to insufficient investment from the private sector and limited regulation of the trade (Mann et al.,1983). A lack of appropriate slaughtering facilities and unsatisfactory slaughtering techniques often contaminates meat and is hazardous to human health. Food safety is the foundation for the future success of this industry. Currently there are growing concerns in critical areas such as biosecurity, good animal husbandry, feeding practices, quality assurance programs and HACCP at the farm level as well as in processing plants (Raghvan, 2007). Good hygiene practices in food establishments like slaughterhouses and meat selling centres are essential for consumer protection and the control of public health risks. This is because the hygiene of food workers can contribute significantly to the outbreak and transmission of foodborne illness (Assefa et al., 2015). All workers in a food handling area are therefore expected to maintain a high degree of cleanliness of their body and clothing, wear suitable and protective clothing to ensure food safety and public health (Nee & Sani, 2011).

There is limited literature about the working facilities and hygiene conditions of the meat sector in Bangladesh. According to Rahman (2001), the livestock in Bangladesh is handled, slaughtered and dressed haphazardly. There are few slaughterhouses with modern facilities and those that exist, are located only in big cities such as Dhaka and Chittagong. Secondly, since there is no lairage, animals generally do not receive antemortem care.

The traditional management system of slaughterhouses and meat selling centres were not sufficient to supply quality meat

for human consumption. Slaughterhouses facilities such as the water supply, concrete floor, drainage system and ventilation system were not sufficient. Workers' hands and clothes were found to be dirty. The crows were found in the slaughter place waiting for thrown by-products and no restriction of dog and cat entering the slaughterhouses. No rules of the Government related to slaughterhouses were executed in the slaughterhouses (Alam et al., 2009).

These two studies were conducted a decade ago and meanwhile a new law about slaughtering animal and meat quality control named "Slaughterhouses Act-2011" was implemented by Bangladesh Government to improve meat safety by the modernisation of facilities. However, food safety cannot be attained solely through the modernisation of facilities. It is also necessary to address the behaviour of people working at slaughterhouses and meat selling centres. The behaviour of workers is connected to various socio-economic factors such as educational background, social status and workers' enthusiasm (connected to their income and social status). On-the-job training of workers is also important for the improvement of food safety.

Therefore, the present study was designed (a) to assess current overall hygienic conditions in slaughterhouses and meat selling centres and (b) to evaluate food safety knowledge of workers of slaughterhouses and meat selling centres considering socio-economic background.

MATERIALS AND METHODS

Study Site

The survey was carried out in twenty slaughterhouses and meat selling centers of two districts, Mymensingh and Gazipur, located in the central north part of Bangladesh (Figure1). The data was collected from July to August 2017.

Questionnaire Design. A questionnaire relating to facilities and hygienic conditions in slaughterhouses and meat selling centres was prepared by modifying from previous studies conducted by Alam et al. (2009) and Cook et al. (2017). Another structural questionnaire was designed to assess food safety knowledge and hygiene practice of workers at slaughterhouses and meat selling centres based on the validated questionnaire of previous research work by Smigic et al. (2016). The questionnaires were translated from English to Bangla to get optimum response from the respondents. The translated questionnaire was pre-tested in two slaughterhouses and meat selling centres of the urban area of each district. The necessary modification was made to make it simple for the respondents to answer with the help of a professional expert. After questionnaire validation, it was used to conduct our main study. The first questionnaire composed of infrastructure and working facilities of slaughterhouses and meat selling centre (roof, cement floor, drainage facilities, handwashing facilities, source of water, and bleeding facilities). The second questionnaire composed of

demographic characteristic of workers (gender, age, education, and experience), hygiene practices (wear a protective coat, and rubber boots) and food safety knowledge of workers (proper handwashing knowledge, handling of meat, storage time of meat, cleaning of equipment, and training). In some questions, the choice of "I don't know" was provided to avoid respondents selecting correct answers by chance.

Data Collection and Analysis

Data were collected from ten slaughterhouses and meat selling centres of each district. The main slaughterhouses of two districts (Mechua Bazar of Mymensingh and Joydebpur of Gazipur) were visited before data collection. The purpose of the visit was to get information on the overall situation of the slaughterhouses of the districts. After getting the necessary information, twenty slaughterhouses were randomly selected from two districts, having a capacity of at least six animals slaughtered per day. A total number of 217 workers was working in the sampled twenty slaughterhouses and meat selling centres. Out of 217 workers, only 116 workers' demographic information

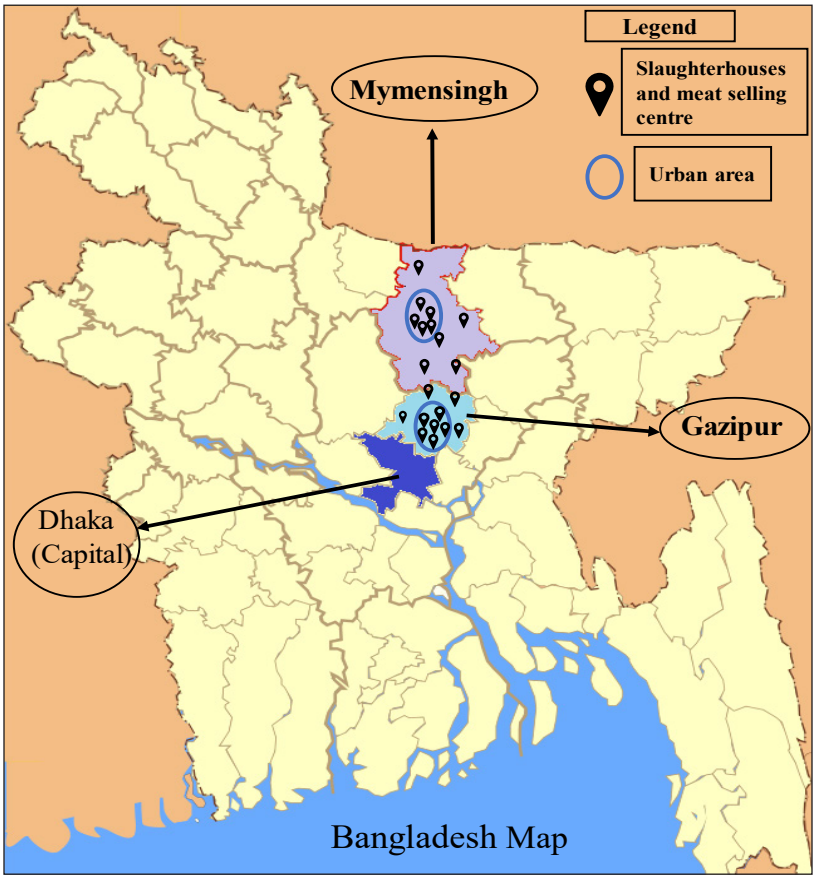

Figure 1. Research sites of Mymensingh and Gazipur Districtsin Bangladesh.

(age, education, experiences) were collected individually and recorded who responded willingly to the questionnaire. Regarding questions about food safety and hygiene practice, workers of 20 sampled slaughterhouses were answered as a group rather than an individual. The facilities and hygienic conditions were assessed through personal interviews and direct observations. In addition, open discussion with workers of the sampled slaughterhouses and meat selling centres was conducted to gain insight into the socio-economic conditions and general concerns.

Data were analysed using IBM SPSS (version 22.0). Demographics and descriptive data were presented in tabular form. The relationship between training and food safety knowledge score were analysed by T-Test Group using SPSS. Knowledge scoring is the sum of correct answers of sixteen food safety-related questions such as washing hand is mandatory after handling raw meat, using the toilet, touching money, handling garbage, blowing the nose, eating or drinking; handling meat when having diarrhoea, vomiting, having wounds on hand; minimum storage time of raw meat at room temperature, the optimum time required for handwashing, knowledge of the zoonotic disease, food poisoning bacteria may enter the food via raw meat, food poisoning bacteria may enter in the food via meat handlers, using gloves can reduce the risk of meat contamination, raw and ready to cook meat can weighed on the same scales.

RESULT AND DISCUSSION

General Description of Sample Slaughterhouses and Meat Selling Centres

Table 1 presents the general description of the sample slaughterhouses and meat selling centres. Out of the total twenty slaughterhouses and meat selling centres surveyed, a majority were managed privately with only two slaughterhouses and meat selling centres being operated by the local government authority. In the study area, the average number of workers per slaughterhouse and meat selling centre was 10.9. There were comparatively more workers in slaughterhouses and meat selling centres in urban than those in semi-urban areas. The average number of animals slaughtered per day was 20.9, where cattle were 4.3 and goat was 16.6. Hasan et al. (2004) conducted a field survey to investigate the management system of slaughterhouses and meat selling centres in Mymensingh district and found that an average number of 13.1 animals (cattle-4.0 and goat-11.0) were slaughtered per day. Alam et al. (2009) conducted a study on the management system of slaughterhouses and meat selling centres to supply quality goat meat for human consumption in Gazipur and found an average number of 22.5 goats slaughtered per day in Gazipur area. The average number of cattle slaughtered per day was like previous studies. But the average number of goats slaughtered per day was different within the study area (Mymensingh-12.0 and Gazipur -21.0).

Table 1
General description of slaughterhouses and meat selling centres (N = 20)

Name of slaughterhouses and meat selling centres	Management (private or public)	Location of slaughterhouses and meat selling centres	District	Total man-power	No. of respondent	No. of animal slaughtered per day		
						Cattle	Goat	Total
Natun Bazar	private	Urban area	M	12	6	4	18	22
Mechua Bazar	public	Urban area	M	22	11	7	60	67
Charpara Bazar	private	Urban area	M	12	6	4	5	9
Kachijuli Bazar	private	Urban area	M	6	5	2	5	7
Sankipara Bazar	private	Urban area	M	10	6	3	6	9
Churkhai Bazar	private	Semi-Urban area	M	6	4	2	4	6
Gouripur Bazar	private	Semi-Urban area	M	7	4	3	3	6
Phulpur Bazar	private	Semi-Urban area	M	8	6	2	6	8
Bhaluka Bazar	private	Semi-Urban area	M	10	5	3	8	11
Gafargaon Bazar	private	Semi-Urban area	M	10	6	2	6	8
Tongi Bazar	private	Urban area	G	23	11	12	46	58
Cherag Ali Bazar	private	Urban area	G	10	6	5	21	26
Tongi College-gate Bazar	private	Urban area	G	8	4	3	5	8
Board Bazar	private	Urban area	G	11	6	4	26	30
ChandonaChowrasta Bazar	private	Urban area	G	13	6	6	21	27
Joydebpur Bazar	public	Urban area	G	17	7	9	51	60
Konabari Bazar	private	Semi-Urban area	G	9	5	6	13	19
Kaliganj Bazar	private	Semi-Urban area	G	7	4	3	11	14
MawnaChowrasta Bazar	private	Semi-Urban area	G	8	4	2	9	11
Sreepur Bazar	private	Semi-Urban area	G	8	4	3	8	11
Total				217	116	85	332	417
Average				10.9	5.8	4.3	16.6	20.9

Source: Field survey (2017)
*Note:*M = Mymensingh, G = Gazipur

Common Facilities and Techniques

The infrastructure and working facilities of the sampled slaughterhouses and meat selling centres were in very poor condition. Table 2 presents common facilities and working conditions of slaughterhouses and meat selling centres in the study areas**.** Out of the twenty slaughterhouses and meatselling centres surveyed, only 20% of the slaughterhouses and meat selling centres had sufficient lairage facilities.

Out of twenty slaughterhouses and meat selling centres, 55% ofslaughterhouses and meat selling centres had roofs, 70% had cement floors and 50% had solid walls. A roof is necessary for the slaughterhouse, even in the slaughterhouse having only a small slaughter slab. It protects the slaughtering process in both hot and cold weather conditions. It also allows for artificial lighting facilities and reduces the inside temperature in the slaughterhouses (Mann et al., 1983). The impermeable, easily cleanable, and rodent-proof floors and walls are necessary for maintaining the proper sanitary level in the slaughterhouses. The floors should be concrete made, smooth but not slippery, and sloped unto the drains adjacent to the wall for easy cleaning (Bengtssom & Whittaker, 1986). Cook et al. (2017) reported that 65% of slaughterhouses had roofs, 89% had a cement floor and 72% slaughterhouses had solid walls in western Kenya.

Only 45% of slaughterhouses and meat selling centres had proper light facilities, 35% had proper ventilation and 50% had drainage facilities. Alam et al. (2009) conducted research in 2007 on slaughterhouses in Gazipur and found that 40% had inadequate light, 40% had improper ventilation and 50% of the slaughterhouses lacked drainage facilities in the Gazipur area. After 10 years, the situation did not improve. The noticeable finding was the lack of infrastructure facilities to ensure food safety, which indicates that there is no improvement from ten years ago. Out of twenty slaughterhouses and meat selling centres, only 40% of slaughterhouses and meat selling centres had access to a toilet but they were not properly cleaned. This situation is not satisfactory and may cause the persistence of zoonotic diseases such as cysticercosis (Mann et al.,1983).

Only 35% of slaughterhouses and meat selling centres had handwashing facilities, and tube wells were the main source of water. The availability of hot and cold water should be equipped for cleaning and workers' hand should be washed with soap and hot water (Food and Agriculture Organization of the United Nations [FAO], 2005). The lack of sufficient water source and washing facilities was observed, and similar conditions were found by Cook et al. (2017) in slaughterhouses of western Kenya.

In all slaughterhouses, animals were slaughtered using the Mohammedan or Halal method. According to the halal guidelines the animal should be killed in a comfortable way. Most of the sample slaughterhouses were found to focus on voicing the name of Allah while cutting the throat. We observed that butchers slaughtered animals by using blunt knives

Table 2
Common facilities and working conditions of slaughterhouses and meat selling centres (N=20)

Characteristics		Percent (%)	Yes (%)	NO (%)
Lairage facilities	Sufficient	**20**		
	Insufficient	30		
	Not Available	50		
Roof present			**55**	45
Cement Floor			**70**	30
Solid walls			**50**	50
Proper light facility			45	**55**
Proper Ventilation			35	**65**
Drainage facility			50	50
Toilet facility			40	**60**
Hand wash facility			35	**65**
Meat Inspector visit daily			**70**	30
Anti-mortem examination			10	**90**
Slaughter a sick animal			10	**90**
Source of water	Municipal	15		
	Tube well	45		
	Motor pump	40		
	Borehole	0		
	River	0		
Bleeding	Ground	45		
	Drainage	50		
	Pit	5		

Source: Field survey (2017)

and animals slaughtered in front of other animals which are not good practices according to halal guidelines. Ahsan et al. (2014) also found the halal guidelines were not followed properly except for voicing the name of God in slaughterhouses in Bangladesh. The name of Allah must be invoked (mentioned) at the time of slaughtering by saying: "BismillahAllahu Akbar (In the name of Allah; Allah is the Greatest)". The animal must be slaughtered using a sharp knife. The knife must not kill due to its weight. If it kills due to impact the meat may not be permissible. Animals should not be slaughtered in front of other animals (Department of Halal Certification, Europe, 2018).

Out of twenty slaughterhouses and meat selling centres, 30% of them slaughtered animals without inspection of a veterinary surgeon or meat inspector. According to s.5.2 of "The Slaughterhouse Act-2011", this violates the law which stipulates that regular inspections are compulsory. Meat inspectors regularly visited 70% of slaughterhouses and meat selling centres in the study area, whereas, veterinary surgeons visited slaughterhouses located

in the district's main point to check animal and meat quality once or twice a week and often perform antemortem examination. Slaughtering infected animals is a risk factor for infection by certain directly transmitted zoonotic diseases like anthrax (Ray et al., 2009).

Ten percent slaughterhouses and meat selling centres reported that they slaughtered sick animals. Cook et al. (2017) found about 9% of the slaughterhouses slaughtered sick animals in western Kenya. This is a common phenomenon in third world countries. Regular inspections may help to improve the situation.

Out of twenty slaughterhouses and meat selling centres, 50% of slaughterhouses and meat selling centres had drainage facilities for bleeding, 45% bleeding on the ground and 5% used a simple pit. In most of the sample slaughterhouses and meat selling centres goats were flayed either on the ground or by hanging method but cattle were always flayed on the ground. Alam et al. (2009) found the same condition in Gazipur in 2007 meaning treatment methods have not changed in ten years.

Workers Background, Experiences, and Attitude

All workers in the sample slaughterhouses and meat selling centres were male (Table 3). Out of the 116 workers who responded, a majority were middle-aged (31-40 years) representing 37% of workers, followed by younger aged (20-30 years) group 28%. A majority of workers surveyed had a basic level education (84%), with most of them graduating from primary school (64%), 15% with secondary education and 5% with tertiary level education. The workers who had tertiary level education were owners and don't regularly participate in the slaughtering process. Sixteen percent of workers had no education. In Bangladesh, the current educational situation is improving. In 2017, 98% of children attended primary school and about 80% completed their primary level education. The national enrolment rate of secondary education and tertiary education is 63% and 17.33% respectively (United Nations Educational, Scientific and Cultural Organization [UNESCO], 2017). Comparing to the national average of education, the educational level of workers in slaughterhouses and meat selling centres are low. Wambui et al.(2017) also reported most of the meat handlers in slaughterhouses in Kenya were middle-aged (31-40 years) and had primary level education only and 8% of workers lacked formal education. Slaughterhouses need workers with technical knowledge, but educated and young people are not interested in working there.

Concerning work experience of the surveyed workers, 40% had 8-16 years of work experience, 35% had 2-8 years of work experience, 19% had more than 16 years of experience and 6% had less than 2 years of experience. In a study examining Serbian meat establishment, Smigic et al. (2016) found most of the workers possessed 2-8 years of work experience. Compared to Serbia, older and more experienced persons are working in the meat sector of Bangladesh. The workers of sample

slaughterhouses and meat selling centres earned an average of 3.5 USD to 4.7 USD/ day (Monthly income 105 USD -141 USD). The average monthly wage of private-sector workers are 156 USD/month in 2017 (Trading Economics, 2018) and the minimum wage of Government employees in Bangladesh was 174 USD/month in 2015 (Ministry of Finance, 2015). The workers were not satisfied with their low income compared to both the government and other private-sector workers. Workers also expressed their dissatisfaction with their social status, and they believed that people had a negative image of their profession.

During the open discussion, two butchers of Mymensingh Sadar shared their bitter experience of finding a suitable groom for their daughters though they completed the graduation course from the National University. Nowadays, children of slaughterhouse and meat selling workers are becoming more educated and desire to find a life partner from the educated civil community. This sentiment also affected the worker's performance and they showed a negative attitude toward animals in their workplaces.

Table 3
Educational status and experiences of slaughterhouses and meat selling centers workers (N=116)

Characteristics		**Percent (%)**
Gender	Male	100
	Female	0
Age	<20	9
	20-30	28
	31-40	37
	41-50	20
	> 50	6
Education	No Education	16
	Primary	64
	Secondary	15
	Tertiary	5
Work Experience	< 2	6
	2-8	35
	8-16	40
	>16	19

Source: Field survey (2017)

Food Safety Knowledge and Hygiene Practices by Workers

The level of food safety knowledge and hygiene practices by workers is shown in Table 4. Out of 20 sampled slaughterhouses and meat selling centres workers interviewed, only 15% of them wore personal protective coats or aprons, and 10% wore rubber or gumboots. Furthermore, only 20% of the workers had a health certificate which guarantees they were free from any kind of contagious disease. The worker of slaughterhouses should use protective clothing to reduce the risk of contamination of meat products. It also minimizes the chance of transmission of zoonotic diseases to meat handlers (Nabukenya et al., 2013). Cook et al. (2017) reported that 53% of slaughterhouses workers of western Kenya wore a protective coat and 49% wore rubber boots. Haileselassieet al. (2013) found 69.2% of abattoirs and butchery workers wore aprons, 96.2% wore gumboots and 84.6% had health certificates in Mekelle city of Ethiopia.

Appropriate and clean clothing helps to reduce the risk of food contamination (Azmi, 2006), but workers were found to be wearing

Table 4
Food safety knowledge and hygienic practices by slaughterhouses and meat selling centres workers (N=20)

Variable		Percent (%)	Yes (%)	No (%)	I don't know (%)
Presence of health certificate			20.0	**80.0**	
Wear protective coat/Apron			15.0	**85.0**	
Wear rubber/gumboots			10.0	**90.0**	
Hands should be washed at least	5 sec	20.0			
	20 sec	**35.0**			
	1 min	20.0			
	I don't know	25.0			
Knowledge of zoonotic disease			**70.0**	30.0	
Food poisoning bacteria can be bought in the food via raw meat			**75.0**	0.0	25.0
Food poisoning bacteria can be bought in the food via meat handler			40.0	30.0	30.0
Using gloves during work can reduce the risk of meat contamination			**90.0**	0.0	10.0
Raw and ready to eat meat can be weighted on the same scales before packing			10.0	**70.0**	20.0
Cleaning of equipment (cutting table, weighing, and knives) during meat handling	Washing with water and soap	5.0			
	Washing with water only	**85.0**			
	smearing with a piece of cloth	10.0			
	other	0.0			
Keeping meat in an open air	Very good handling	0.0			
	Good handling	0.0			
	Bad handling	**55.0**			
	Very bad handling	45.0			
Keeping meat in a condition better than this is very important			**70.0**	30.0	
Training on food safety			15.0	**85.0**	
Willingness to attend training on food safety or meat hygiene			**90.0**	10.0	

Source: Field survey (2017)

dirty clothes in the present study area. Compared to other developing countries, workers of the sample slaughterhouses and meat selling centres showed negligence towards hygiene. With regards to knowledge about hygienic practices such as hands should be washed for at least 20 seconds, 35 % of respondents were able to identify the correct answer. It is not easy to reduce contamination in the meat industry due to a shortage of necessary knowledge of workers (Mann et al., 1983).

About 70% of the workers in the study area knew that zoonotic disease could be transmitted from animals to humans but preventive measures were not taken by most of them. Cook et al. (2017) reported that only 34% of slaughterhouse workers knew about the zoonotic disease. About 75% of the respondents believed that food poisoning

bacteria could be introduced to the food via raw meat and only 40% of the respondents believed that food poisoning bacteria could be transmitted to the food via meat handlers. Proper glove use can decrease the transfer of pathogens from hands to food (Green et al., 2007) and 90% of the respondents understood that using gloves during work can reduce the risk of meat contamination. Unlike previous studies (Jianu & Golet, 2014) observations from this study showed that very few respondents regularly wear gloves.

About 70% of slaughterhouses and meat selling centres workers involved in this study knew that raw and ready to eat meat cannot be weighed on the same scale before packing. The results show that the situation is more similar to the previous study conducted by Smigic et al. (2016) which found that the basic level of hygiene knowledge of developing countries like Bangladesh and Kenya is almost the same.

Most of the sampled slaughterhouses and meat selling centres (85%) used only water for cleaning of equipment (cutting table, weighing and knives) during meat handling. About 55% of respondents believed that keeping meat in the open air is bad handling, while 45% believed that this is very bad handling. Aburi (2012) reported that 40% of respondents stated that keeping meat in the open air was bad handling. Most of the respondents (70%) also believed that meat should be kept under better conditions than storing it in open-air conditions. Compared to the findings on other developing countries, workers in the surveyed slaughterhouses and meat selling centres were more knowledgeable about safe meat handling.

In this study, about 85% of the respondents did not have any training concerning food safety and meat hygiene, although most of the slaughterhouse and meat selling centres workers (90%) expressed their willingness to attend training on food safety or meat hygiene. Training programs improve the knowledge of meat handlers (Ansari-Lari et al., 2010). The training of meat handlers is key to prevent foodborne diseases (Nel et al., 2004; Shojaei et al., 2006). Workers in slaughterhouses are expected to have received training (Nel et al., 2004).

Table 5 shows the differences in workers' knowledge level of those who have had training and who have not had training. Knowledge scoring is the sum of correct answers of sixteen food safety-related

Table 5
Group Statistics of Training and Food Safety Knowledge (N=20)

Knowledge scoring (Full Score=16)		Respondent number	Mean Score *	SD
Training	NO	17	10.8814	2.6899
	YES	3	15.0000	1.0000

Note: * 5 % level of significant
Source: Field survey (2017) (T-Test Groups, IBM SPSS version 22.0)

questions and each question answered correctly rewarded one point and zero for incorrect answers. The level of significance is 0.134 (p>0.05), so there is a significant difference regarding knowledge between the trained and untrained workers. Workers who received training had significantly better knowledge than untrained workers. This demonstrates the importance of training and training of workers should be considered as early as possible.

CONCLUSION

To understand the present hygienic situation and workers' knowledge about food safety of meat, questionnaire and interview surveys were conducted at twenty slaughterhouses and meat selling centres in Mymensingh and Gazipur districts of Bangladesh. The overall working condition of the surveyed slaughterhouses and meat selling centres were not at a satisfactory level. The meat was handled by workers under unsatisfactory sanitary conditions. Slaughtering and dressing operations were not well organised. The present situation may increase occupational hazards among the workers and contaminated meat may enter the meat market. To reduce the risk, improvement of working facilities and hygienic practices are needed to ensure the quality of meat. The government and local authorities should take the initiative to construct simple small modern slaughterhouses and meat selling centres equipped with all the facilities needed for quality meat processing and proper waste disposal to prevent environmental pollution. Training is recommended to improve workers' skills and improve the food safety knowledge of workers, butchers and also meat inspectors to reduce the contamination risk. Improvement in the motivation of workers is also needed and can be addressed through the consideration of their social status and salary. Even with the limited budget of local government in Bangladesh, a training session can be conducted and would be effective to improve the hygienic condition of slaughterhouses and meat selling centres.

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